

**Analyzing the Impact of Chinese Wheat Support Policies on U.S. and Global Wheat
Production, Trade and Prices**

A Study Prepared for the U.S. Wheat Associates

Miguel Carriquiry and Amani Elobeid
Global Agricultural Market and Policy Research Services

Dermot Hayes
Iowa State University

January 2016

Executive Summary

This study examines the impact of the removal of price supports and input subsidies for wheat in China on production, trade and prices in both the U.S. and globally. China plays a significant role in the world wheat market. The country also provides trade distorting support. An adaption of the CARD-FAPRI modeling system is used in this analysis and the modeling system is augmented to include any wheat support and trade policies that are not already present in the model for China. Results are provided in terms of deviations from the base case for marketing year 2021/22, which is the last year in the projection period.

Wheat support policies and trade barriers encourage domestic production and depress world prices. Removal of these policies, which reduces domestic wheat prices, results in a reduction in domestic production and an increase in domestic consumption. Lower supply and increased demand lead to higher global prices of wheat, which tend to benefit wheat-exporting countries.

Removal of domestic support for wheat in China has significant impacts. The fall in production, resulting from the decrease in domestic price and higher production costs, leads to an increase in imports to 9.6 million metric tons, the in-quota level. As a result, world wheat price increases by 2.8%. The U.S. responds to the higher price by increasing production and consequently, net exports, which increase by 6%, or 1.5 million metric tons, between the base case and the scenario.

Globally, the removal of price support and input subsidies leads to an increase in world wheat prices and global net trade relative to the base case. When domestic support is removed in China and world wheat prices increase, world net trade increases by almost 5% when compared to the base case. Generally speaking, the higher wheat prices encourage net exporting countries like Australia, Canada, and the European Union to increase production and exports (Table I) while discouraging net importers from increasing their demand and imports of wheat. Prices of other (competing) grains (namely, corn, barley and sorghum) also experience an increase, albeit small, in response to the changes in the global wheat market.

Table I. Impact of the removal of Chinese wheat domestic support on production and net trade in China, the United States, and select net-exporting countries in 2021/22

	Baseline	All Countries Scenario (thousand metric tons)	% Change
China			
Production	127,486	121,359	-4.8%
Net Trade	-1,936	-9,640	397.9%
Australia			
Production	28,366	28,555	0.7%
Net Trade	21,619	21,838	1.0%
Canada			
Production	26,689	26,946	1.0%
Net Trade	16,934	17,183	1.5%
European Union			
Production	158,522	158,595	0.1%
Net Trade	13,275	13,454	1.4%
United States			
Production	58,195	59,166	1.7%
Net Trade	23,358	24,838	6.3%
Farm Price	246	253	2.7%

1. Introduction

The aim of domestic support policies and trade barriers is to increase domestic prices and production. Domestic agricultural policy regimes include several components that subsidize and provide price support to domestic producers with the objectives of promoting and supporting agricultural production, improving rural living standards, and enhancing food security by reducing the reliance on imports. These policy objectives, especially the maintenance of a certain standard of rural living, have led to the implementation of high domestic price supports in many developing countries. Additionally, subsidies on production inputs are also provided as a way to improve the competitiveness of domestic production and expand local supplies. However, these policies come at the expense of global trade in the form of higher global supplies and lower world prices, which negatively impact competitive exporters. The removal of these domestic support policies in key advanced developing countries is expected to have a significant impact on the world market in general and on the U.S. market in particular.

The main objective of this study is to assess the impact of the removal of direct subsidies and price support for wheat in China on U.S. and world agricultural markets. This country was chosen because of its significant role in the world wheat market and its trade-distorting domestic support. This report is organized as follows. The next section briefly describes the CARD-FAPRI modeling system used in this analysis, and the changes made in the model specification to capture the removal of the support measures. Section 3 presents the results in terms of changes in global trade and representative world prices, as well as in wheat supply and utilization in the U.S., China, and some of the major wheat-exporting countries.

2. Methodology

We use the CARD-FAPRI modeling system to analyze the impact of the removal of subsidies and price support for wheat in China on U.S. and world agricultural markets. The CARD-FAPRI model is a system of econometric, partial equilibrium, non-spatial models of global agriculture. The models cover all major temperate crops, sugar, biofuels, dairy, and livestock and meat products for all major producing and consuming countries and are calibrated on 2012 data.¹ The interlinked models are used to generate ten-year baseline projections for agricultural markets and for policy analysis based on the baseline projections.² These models have been widely used for policy analyses and published in peer-reviewed journals (see Dumortier et al., 2012; Fabiosa et al., 2010; Hayes et al., 2009; Tokgöz et al., 2008; and Searchinger et al., 2008).

Data on supply and utilization for the commodities are obtained primarily from the United States Department of Agriculture (USDA) Production, Supply and Distribution (PSD) Online (for major crops) and the Food and Agriculture Organization of the United Nations (FAO) FAOSTAT (for livestock, dairy and some sugar components). Macroeconomic historical data and projections are obtained from the International Financial Statistics (IFS) of the International Monetary Fund and IHS Global Insight, respectively. The macroeconomic variables, which include gross domestic product (GDP), GDP deflator and exchange rate by country, are exogenous to the model. Agricultural and trade policies are also treated as exogenous.

¹ Although the models are calibrated to 2012 data and not the most recent data, what really matters for this analysis is the difference between the reference prices and the support prices to determine the level of support, which is calculated as the percent difference between the two prices.

² More information on the CARD-FAPRI modeling structure can be found in <http://www.fapri.iastate.edu/models/>. To provide a sense of the parameter range in the models, the website <http://www.fapri.iastate.edu/tools/elasticity.aspx> offers an elasticity database although this database is somewhat dated.

The models specify behavioral equations for production (area harvested and yield for crops), consumption, stocks, and trade between countries/regions. For each commodity, a number of countries and regional aggregates are included in order to have worldwide coverage. The models solve for world reference prices using a world market-clearing mechanism that equalizes net imports and net exports without accounting for sources of imports and destinations of exports. They project production, consumption, stocks, trade and prices by commodity and country for the period 2012/13 to 2021/22 (marketing years) for crops and 2012 to 2021 (calendar years) for livestock, dairy and biofuels. The models are linked such that changes in one commodity sector will impact the other sectors. Additionally, the models capture the substitution between commodities on the demand side as well as the competition for land on the supply side. For example, if the price of wheat increases and wheat becomes more expensive, it will be substituted away on the demand side as users shift to other crops such as corn, barley, and sorghum. Also, with the price increase, as its returns become higher relative to the returns of competing crops, wheat will start to outbid other crops in land allocation.

For this analysis, the models were first run in a business-as-usual mode, which we label the “base case” or “baseline”. The base case included all relevant domestic wheat policies in key countries. Then the modeling system was modified in order to simulate a scenario in which the wheat price support and the input subsidies were removed in China.

After the changes, the modeling system was run again and a new global agricultural market equilibrium was obtained in the scenario. The new equilibrium is labeled the “scenario”. By comparing the scenario against the base case, we can estimate the impacts of the specific support measures on both domestic (U.S.), and global agricultural markets.

The removal of the price supports and input subsidies in China was implemented in the following steps.

Steps to remove the wheat price support:

- a. We estimated the Chinese wheat local price using the world reference price, exchange rate, and any tariffs. The price of hard red winter wheat (HRW) was used as the world reference price in calculating the local price for China.
- b. We calculated an ad-valorem equivalent of the support price relative to the local price by year in history, and the three-year average, 2012/13 to 2014/15, was used to reduce the price in the projection period. This price support was zero if the local price was above the support price for all the years considered.

Steps to remove the wheat input subsidies:

- a. The subsidy was first converted to a per hectare equivalent. The average over 2012/13 to 2014/15 was used.
- b. The converted subsidy was then added to the cost of production in the wheat area equations that drive production in the modeling system.

The removal of wheat price supports, which results in a reduction in domestic prices, was implemented on the baseline level domestic prices. Additionally, the change in input subsidies was added to the domestic cost of production in the scenario. It should be noted that in the new scenario equilibrium, the percent change in prices is different than the changes implemented in the base case as the markets adjust to the changes in the wheat's supply and demand as well as to those of competing or substituting products. This means that while the initial reduction in the wheat price in China is 23.6%, reflecting the removal of the price support, the change in the final

price after all markets adjust and are in equilibrium, is not a 23.6% reduction relative to the base case.

It should also be noted that strong integration and interactions are present in markets for agricultural products. A few examples should help illustrate these interactions. On the demand side, shocks to the wheat market will affect the markets for corn and soybeans due to its impacts on both the size of the livestock sector (the scale effect) and the substitutability of these products in the feed ration (the substitution effect). On the supply side, shocks in the market and the price of wheat will affect the markets for corn and soybeans as the areas dedicated to these crops are altered based on the relative profitability of competing crops as the prices of these crops change. The direction and magnitude of the impact on wheat will depend on the relative size of the competing effects.

The results that we review and summarize here embed the changes and adjustments observed in all these interrelated markets that are needed to reach a new equilibrium under the new economic environment induced by the policy changes. This highlights the need to use global agricultural models, such as the CARD-FAPRI model, that adequately capture the interactions in the highly interrelated global markets for agricultural products.

3. Results

A summary of the results for production, use, and net trade for China, the U.S., and three major wheat-exporting countries (Australia, Canada, and the European Union) as well as wheat prices and net trade for the world is presented in this section. The results are presented in terms of deviations from the base case and are shown for the marketing year 2021/22 for crops, which is the last year of projection. More detailed results by year (2012/13 to 2021/22) for select countries can be found in Appendix A. Once the models reach a new equilibrium, the direction of the

change in prices relative to the base case may be different than the initial change, i.e., the equilibrium prices may be higher or lower than the base case prices depending on market interactions. Additionally, given the U.S. market share in the grains world market, the U.S. is treated as the residual supplier in the modeling system. This means that the representative world price is solved within the U.S. market and the U.S. price is transmitted to the rest of the world through price transmission equations. This is true for wheat, corn, sorghum and barley.

3.1. Impact of the Removal of Support Prices and Input Subsidies in China

In the past, China had two support prices, one for red wheat and the other for white wheat, with the support price for white wheat set at a higher level than for red wheat in most years (2008/09 – 2010/11). However, since 2012/13, China has set the same support price for both types of wheat. We provide the calculations for the price support and input subsidies implemented in the model for China in Table 1. In terms of the price support, the wheat local price was estimated using the world reference price and the exchange rate, adjusted for import tariffs, for the years between 2011/12 and 2014/15. Then an ad-valorem equivalent of the support price relative to the local price was calculated and the three-year average was used to reduce the domestic wheat price in the projection period. The average support for the three-year period that was implemented in the model was 23.6%.

In terms of the input subsidies, based on the data provided in the DTB Associates 2014 Report, the direct payments and inputs subsidies for wheat were added together and then converted to input subsidy per hectare for each year between 2008/09 and 2014/15. Then, the average input subsidy of RMB 1,309 per hectare for the years 2012/13 to 2014/15 was added to the cost of production in the area equation for wheat in China.

Table 1. Price support and input subsidies implemented in the model for China

Price Support Calculation							
	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
Support price* (RMB/MT)	1,544	1,693	1,858	2,015	2,140	2,296	2,354
Reference price (US\$/MT)	264	205	284	290	332	309	252
Exchange rate** (RMB/US\$)	6.94	6.82	6.76	6.46	6.30	6.19	6.15
Local price*** (RMB/MT)	1,852	1,412	1,940	1,890	2,113	1,930	1,564
Support****	0%	20%	0%	7%	1%	19%	51%
Input Subsidy Calculation							
Estimated payments to wheat (US\$ millions)							
Direct payment program for wheat	600	590	600	620	620	620	
Fuel/fertilizer subsidies for wheat	2,600	3,000	3,300	3,600	4,400	4,500	
Total subsidy	3,200	3,590	3,900	4,220	5,020	5,120	
Subsidy per hectare							
Subsidy per hectare (US\$/hectare)	136	148	162	174	207	212	213
Subsidy per hectare (RMB/hectare)	942	1,011	1,092	1,124	1,304	1,314	1,308

* Price for red wheat only until 2012/13 and calendar year U.S. dollar price was converted to marketing year and local currency; ** Exchange rates are implied from the DTB report;

*** Reference price converted to local currency and adjusted for import tariffs; **** Percent difference between the local price and the support price

Source: Calculations by the authors based on DTB Associates, LLP, 2014.

3.1.1. Impact on China's Wheat Sector

Table 2 shows the impact of the removal of wheat price support and agricultural (input) subsidies in China on the country's wheat sector. The removal of price support and input subsidies, which represents lower support for production, results in an initial reduction in the domestic prices of wheat as well as an increase in the crop's cost of production, respectively. As a result, domestic production declines by almost 5% (through lower prices and higher costs of production) in 2021/22 relative to the base case. Domestic use or consumption increases by 1.2% as food and

other uses rises by 1.6 million metric tons (1.5%) while feed increases slightly by 0.3%. Ending stocks increase by 1% relative to the base case. Since the decline in production is much larger than the increase in consumption, net imports increase to 9.6 million tons, which is the quota limit.³

Table 2. Impact of the removal of wheat domestic support on China's wheat sector in 2021/22

	Base case	Scenario	Difference	Percent change
	(Thousand metric tons)			
Wheat				
Production	127,486	121,359	-6,127	-4.81%
Use	203,719	206,154	2,436	1.20%
Feed	22,256	22,327	71	0.32%
Food and other	106,910	108,498	1,588	1.49%
Ending stocks	74,553	75,330	777	1.04%
Net trade*	-1,936	-9,640	-7,704	397.88%

* Positive values indicate net exports while negative values indicate net imports.

3.1.2. Impact on the United States' Wheat Sector

Table 3 shows the impact on the U.S. wheat sector if wheat domestic support is removed in China. The significant increase in Chinese wheat demand (imports) from the rest of the world results in an almost 3% increase in the world wheat price (see Section 3.1.3). The U.S. wheat farm price increases from US\$246 per metric ton to US\$253 per metric ton in 2021/22 relative to the base year. This results in about a 2% increase in U.S. wheat production and a decline in domestic use driven mainly by a fall in feed use. The increase in wheat production combined with the decline in domestic use leads to a 1.5 million metric ton increase in net exports in the U.S. in 2021/22.

³ China's wheat import quotas are capped at 9.64 million metric tons, with an in-quota tariff rate of 1 percent and an out-of-quota tariff of 65 percent.

Table 3. Impact of the removal of China’s wheat domestic support on the U.S. wheat sector in 2021/22

	Base case	Scenario	Difference	Percent change
	(Thousand metric tons)			
Production	58,195	59,166	971	1.67%
Use	58,355	57,820	-536	-0.92%
Feed	4,414	3,947	-467	-10.57%
Food and other	30,453	30,383	-70	-0.23%
Ending stocks	23,489	23,489	1	0.003%
Net trade*	23,358	24,838	1,480	6.34%
	(U.S. dollars per metric ton)			
Farm price	246	253	7	2.74%

* Positive values indicate net exports while negative values indicate net imports.

3.1.3. *Impact on World Wheat Markets and Select Exporting Countries*

Chinese wheat production averaged between 17% and 18% of global wheat production while Chinese wheat use averaged about 18% of total wheat use during the period 2011/12 to 2014/15. Thus, China is a significant player in the world wheat market and that is reflected in the impact of the changes in the domestic support policies on the global market.

Table 4 shows the changes in global wheat as well as global grain prices and the changes in net trade in 2021/22. Overall, the significant change in wheat net trade in China is reflected in the world wheat prices increasing by 2.8% between the base case and the scenario. Corn, barley and sorghum prices register smaller changes (by 0.4%, 0.5% and 0.4%, respectively) relative to the base case. Wheat net trade increases by 4.7% or 5.7 million metric tons between the base case and the scenario. The trade impacts in the other grains markets are small.

Table 4. Impact of the removal of China’s wheat domestic support on global grain prices and net trade in 2021/22

	Base case	Scenario	Difference	Percent change
Prices	(U.S. dollar per metric ton)			
Wheat*	287	295	8	2.83%
Corn	244	245	1	0.37%
Barley	206	207	1	0.52%
Sorghum	252	253	1	0.39%
Net trade**	(Thousand metric tons)			
Wheat	121,153	126,826	5,673	4.68%
Corn	106,503	106,485	-17	-0.02%
Barley	20,506	20,483	-23	-0.11%
Sorghum	8,475	8,460	-15	-0.18%

* U.S. fob Gulf; ** Positive values indicate net exports while negative values indicate net imports.

3.1.4. Impact on World Wheat Markets and Select Countries

The European Union produced, on average, almost 21% of total world production between 2011/12 and 2015/16. Australia and Canada are also among the top producers of wheat, ranking under China, the European Union, India and Russia. All three countries are net exporters of wheat, each averaging about 20 million metric tons between 2011/12 and 2015/16 (USDA PSD Online).

Table 5 shows the production and net export changes in the wheat sectors for the three countries in 2021/22. The removal of the domestic wheat support increases net exports in the European Union, Australia and Canada as world prices increase and these countries respond by increasing domestic production. In 2021/22, net exports increase by 219 thousand metric tons in Australia, 250 thousand metric tons in Canada, and 179 thousand metric tons in the European Union between the base case and the scenario.

Table 5. Impact of the removal of China's wheat domestic support on the wheat sector in select wheat-exporting countries in 2021/22

Australia	Base case	Scenario	Difference	Percent change
	(Thousand metric tons)			
Production	28,366	28,555	189	0.67%
Domestic Use	14,940	14,852	-88	-0.59%
Feed Use	3,472	3,452	-20	-0.57%
Food and Other	3,231	3,218	-13	-0.39%
Ending Stocks	8,238	8,182	-56	-0.68%
Net Trade	21,619	21,838	219	1.01%
Canada				
Production	26,689	26,946	257	0.96%
Domestic Use	15,061	15,069	7	0.05%
Feed Use	3,716	3,722	6	0.17%
Food and Other	5,976	5,977	1	0.02%
Ending Stocks	5,369	5,369	0	0.00%
Net Trade	16,934	17,183	250	1.47%
European Union				
Production	158,522	158,595	73	0.05%
Domestic Use	62,232	157,951	-115	-0.07%
Feed Use	82,916	62,181	-50	-0.08%
Food and Other	12,919	82,860	-56	-0.07%
Ending Stocks	158,067	12,911	-8	-0.07%
Net Trade	13,275	13,454	179	1.35%

References

DTB Associates, LLP. 2014. "Agricultural Subsidies in Key Developing Countries: November 2014 Update."

Dumortier, J., Dermot J. Hayes, Miguel Carriquiry, Fengxia Dong, Xiaodong Du, A. Elobeid, Jacinto F. Fabiosa, Pamela A. Martin, and Kranti Mulik." The effects of potential changes in United States beef production on global grazing systems and greenhouse gas emissions." *Environmental Research Letters*, 7(2) 7 024023 doi:10.1088/1748-9326/7/2/024023, June 2012.

Fabiosa, J.F., J.C. Beghin, F. Dong, A. Elobeid, S. Tokgöz, and T. Yu. "Land Allocation Effects of the Global Ethanol Surge: Predictions from the International FAPRI Model". *Land Economics*, 86(4):687-706, November 2010.

FAOSTAT. 2012. <http://faostat.fao.org/site/567/DesktopDefault.aspx?PageID=567#anchor>. (Accessed July 2012).

Hayes, D.J., B.A. Babcock, J. Fabiosa, S. Tokgöz, A. Elobeid, T. Yu, F. Dong, C. Hart, W. Thompson, S. Meyer, E. Chavez, and S. Pan. October 2008. "Biofuels: Potential Production Capacity, Effects on Grain and Livestock Sectors, and Implications for Food Prices and Consumers," *Journal of Agriculture and Applied Economics*, 41(2):465-491, August 2009.

Tokgöz, S., A. Elobeid, J. Fabiosa, D.J. Hayes, B.A. Babcock, T. Yu, F. Dong, and C.E. Hart, "Bottlenecks, Drought and Oil Price Spikes: Impact on U.S. Ethanol and Agricultural Sectors." *Review of Agricultural Economics*, 30(4), 2008.

Searchinger, T., R. Heimlich, R. Houghton, F. Dong, A. Elobeid, J. Fabiosa, S. Tokgöz, and T. Yu. "Factoring Greenhouse Gas Emissions from Land Use Change into Biofuel Calculations." *Science*, February 2008.

USDA PSD Online <http://apps.fas.usda.gov/psdonline/>

**Analyzing the Impact of Chinese Wheat Support Policies
on U.S. and Global Wheat Production, Trade and Prices**

Appendix A: Detailed Results

China Scenario: Wheat Price and Trade

	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22
World Price	(U.S. Dollars per Metric Ton)										
Baseline	317.75	276.12	288.70	291.03	294.62	290.00	289.27	290.25	287.15	286.51	286.47
Scenario	317.75	290.00	296.89	301.45	303.88	299.51	298.34	299.23	295.71	294.91	294.58
Change	0.0	13.9	8.2	10.4	9.3	9.5	9.1	9.0	8.6	8.4	8.1
% chg	0.00%	5.03%	2.84%	3.58%	3.15%	3.28%	3.14%	3.09%	2.98%	2.93%	2.83%
Total Trade	(Thousand Metric Tons)										
Baseline	105,114	109,277	111,344	112,195	113,677	114,345	115,600	116,795	118,158	119,656	121,153
Scenario	105,114	114,898	118,064	118,443	120,002	120,390	121,699	122,774	124,051	125,421	126,826
Change	0.0	5,620.7	6,720.0	6,247.7	6,325.0	6,045.0	6,099.3	5,978.9	5,892.3	5,764.3	5,673.0
% chg	0.00%	5.14%	6.04%	5.57%	5.56%	5.29%	5.28%	5.12%	4.99%	4.82%	4.68%
Net Trade of Selected Countries											
United States											
Baseline	23,269	21,625	22,850	22,322	22,570	22,460	22,564	22,897	22,966	23,284	23,358
Scenario	23,269	23,632	24,434	24,124	24,266	24,173	24,217	24,524	24,541	24,826	24,838
Change	0.0	2,006.7	1,584.4	1,802.6	1,695.9	1,713.1	1,653.2	1,627.8	1,575.0	1,542.6	1,480.0
% chg	0.00%	9.28%	6.93%	8.08%	7.51%	7.63%	7.33%	7.11%	6.86%	6.63%	6.34%
Australia											
Baseline	18,900	20,066	20,021	20,047	20,254	20,486	20,827	21,027	21,262	21,494	21,619
Scenario	18,900	20,190	20,232	20,266	20,476	20,707	21,051	21,248	21,484	21,713	21,838
Change	0.0	123.2	210.9	219.1	221.6	221.1	223.9	221.2	222.3	218.8	218.8
% chg	0.0%	0.6%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.0%	1.0%	1.0%
Canada											
Baseline	17,600	16,413	16,653	16,765	16,688	16,841	16,772	16,745	16,795	16,855	16,934
Scenario	17,600	16,392	16,961	16,970	16,942	17,078	17,022	16,988	17,047	17,102	17,183
Change	0.0	-21.2	307.6	205.3	253.5	237.0	250.0	243.8	251.1	246.9	249.7
% chg	0.0%	-0.1%	1.8%	1.2%	1.5%	1.4%	1.5%	1.5%	1.5%	1.5%	1.5%
China											
Baseline	-500	-683	-794	-926	-1,055	-1,195	-1,334	-1,475	-1,631	-1,784	-1,936
Scenario	-500	-9,640	-9,640	-9,640	-9,640	-9,640	-9,640	-9,640	-9,640	-9,640	-9,640
Change	0.0	-8,957.2	-8,845.6	-8,713.6	-8,585.4	-8,445.2	-8,306.3	-8,165.3	-8,009.2	-7,856.2	-7,703.8
% chg	0.0%	1311.9%	1113.5%	940.6%	814.1%	706.9%	622.8%	553.7%	491.1%	440.4%	397.9%
European Union											
Baseline	9,500	14,136	13,534	13,693	13,669	13,514	13,450	13,430	13,355	13,306	13,275
Scenario	9,500	14,559	13,759	13,958	13,883	13,730	13,655	13,631	13,546	13,492	13,454
Change	0.0	422.9	225.2	265.1	213.4	215.9	204.5	201.1	191.3	186.4	179.1
% chg	0.0%	3.0%	1.7%	1.9%	1.6%	1.6%	1.5%	1.5%	1.4%	1.4%	1.3%

China Scenario: Wheat Production and Consumption

	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22
World	(Thousand Metric Tons)										
Production											
Baseline	683,385	695,511	698,944	705,297	713,433	722,181	729,888	735,166	744,097	751,326	758,101
Scenario	683,385	693,258	698,377	703,447	712,073	720,400	728,381	733,530	742,495	749,690	756,509
Change	0.0	-2,252.8	-566.9	-1,849.7	-1,359.5	-1,780.5	-1,506.8	-1,636.3	-1,601.4	-1,635.4	-1,592.6
% chg	0.00%	-0.32%	-0.08%	-0.26%	-0.19%	-0.25%	-0.21%	-0.22%	-0.22%	-0.22%	-0.21%
Feed Use											
Baseline	126,155	127,590	126,881	128,797	131,133	133,714	136,350	138,448	140,934	143,017	145,447
Scenario	126,155	126,076	126,051	127,742	130,220	132,789	135,487	137,603	140,138	142,240	144,714
Change	0.0	-1,513.8	-829.2	-1,055.2	-912.6	-924.3	-863.2	-845.6	-795.1	-776.4	-732.9
% chg	0.00%	-1.19%	-0.65%	-0.82%	-0.70%	-0.69%	-0.63%	-0.61%	-0.56%	-0.54%	-0.50%
Food and Other											
Baseline	545,132	554,136	564,661	568,259	574,360	579,829	585,582	589,196	595,188	600,756	605,466
Scenario	545,132	553,028	564,652	567,663	573,911	579,113	584,948	588,466	594,436	599,943	604,624
Change	0.0	-1,107.4	-9.2	-596.1	-449.5	-715.5	-633.3	-730.6	-752.1	-813.2	-842.9
% chg	0.00%	-0.20%	0.00%	-0.10%	-0.08%	-0.12%	-0.11%	-0.12%	-0.13%	-0.14%	-0.14%
Ending Stocks											
Baseline	202,174	209,707	210,857	212,845	214,533	216,920	218,623	219,892	221,615	222,916	223,851
Scenario	202,174	210,075	211,497	213,287	214,977	217,223	218,916	220,126	221,794	223,049	223,968
Change	0.0	368.3	640.1	442.0	444.0	303.2	293.2	233.9	179.6	133.7	116.7
% chg	0.00%	0.18%	0.30%	0.21%	0.21%	0.14%	0.13%	0.11%	0.08%	0.06%	0.05%
Consumption											
Baseline	671,287	681,726	691,541	697,056	705,493	713,542	721,932	727,645	736,121	743,773	750,914
Scenario	671,287	679,105	690,703	695,405	704,131	711,902	720,435	726,068	734,574	742,183	749,338
Change	0.0	-2,621.3	-838.4	-1,651.3	-1,362.1	-1,639.9	-1,496.5	-1,576.1	-1,547.2	-1,589.6	-1,575.8
% chg	0.00%	-0.38%	-0.12%	-0.24%	-0.19%	-0.23%	-0.21%	-0.22%	-0.21%	-0.21%	-0.21%
United States											
Production											
Baseline	54,413	56,456	56,099	55,654	56,193	56,502	56,783	57,107	57,571	57,913	58,195
Scenario	54,413	57,197	57,277	56,655	57,261	57,538	57,818	58,130	58,578	58,903	59,166
Change	0.0	740.8	1,177.3	1,000.3	1,068.3	1,036.7	1,035.5	1,023.2	1,006.6	989.4	970.7
% chg	0.00%	1.31%	2.10%	1.80%	1.90%	1.83%	1.82%	1.79%	1.75%	1.71%	1.67%
Feed Use											
Baseline	4,354	5,523	5,086	4,960	4,847	4,803	4,788	4,578	4,575	4,392	4,414
Scenario	4,354	4,526	4,524	4,262	4,239	4,198	4,222	4,031	4,062	3,896	3,947
Change	0.0	-997.3	-562.0	-698.4	-607.4	-605.4	-565.6	-547.8	-512.5	-495.2	-466.7
% chg	0.00%	-18.06%	-11.05%	-14.08%	-12.53%	-12.60%	-11.81%	-11.96%	-11.20%	-11.28%	-10.57%
Food and Other											
Baseline	27,711	28,222	28,355	28,602	28,829	29,110	29,369	29,621	29,900	30,163	30,453
Scenario	27,711	28,144	28,311	28,544	28,778	29,055	29,315	29,566	29,846	30,109	30,383
Change	0.0	-77.7	-44.8	-57.4	-51.5	-55.2	-53.9	-54.8	-54.2	-54.8	-69.6
% chg	0.00%	-0.28%	-0.16%	-0.20%	-0.18%	-0.19%	-0.18%	-0.18%	-0.18%	-0.18%	-0.23%
Ending Stocks											
Baseline	22,545	23,627	23,430	23,196	23,139	23,263	23,320	23,326	23,452	23,522	23,489
Scenario	22,545	23,436	23,439	23,159	23,133	23,240	23,299	23,304	23,429	23,496	23,489
Change	0.0	-191.0	8.8	-37.4	-6.2	-22.4	-20.6	-22.0	-23.4	-26.5	0.7
% chg	0.00%	-0.81%	0.04%	-0.16%	-0.03%	-0.10%	-0.09%	-0.09%	-0.10%	-0.11%	0.00%
Consumption											
Baseline	32,065	33,745	33,442	33,562	33,676	33,913	34,157	34,200	34,474	34,555	34,866
Scenario	32,065	32,670	32,835	32,806	33,017	33,253	33,537	33,597	33,908	34,005	34,330
Change	0.0	-1,075.0	-606.9	-755.8	-658.9	-660.6	-619.5	-602.6	-566.8	-550.0	-536.3
% chg	0.00%	-3.19%	-1.81%	-2.25%	-1.96%	-1.95%	-1.81%	-1.76%	-1.64%	-1.59%	-1.54%

China Scenario: Wheat Production and Consumption (continued)

	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22
Australia	(Thousand Metric Tons)										
Production											
Baseline	26,000	26,250	26,115	26,221	26,516	26,876	27,304	27,551	27,874	28,178	28,366
Scenario	26,000	26,254	26,301	26,393	26,706	27,062	27,496	27,740	28,066	28,366	28,555
Change	0.0	3.8	185.8	172.3	189.8	185.2	192.1	188.2	191.9	187.7	189.3
% chg	0.00%	0.01%	0.71%	0.66%	0.72%	0.69%	0.70%	0.68%	0.69%	0.67%	0.67%
Feed Use											
Baseline	3,500	3,015	2,962	3,014	3,083	3,158	3,236	3,300	3,361	3,418	3,472
Scenario	3,500	2,990	2,943	2,992	3,061	3,136	3,215	3,279	3,340	3,397	3,452
Change	0.0	-24.4	-19.0	-22.5	-21.3	-21.9	-21.2	-21.3	-20.5	-20.5	-19.7
% chg	0.00%	-0.81%	-0.64%	-0.75%	-0.69%	-0.69%	-0.66%	-0.65%	-0.61%	-0.60%	-0.57%
Food and Other											
Baseline	3,100	3,125	3,132	3,136	3,155	3,159	3,168	3,170	3,188	3,215	3,231
Scenario	3,100	3,105	3,119	3,119	3,140	3,144	3,154	3,156	3,175	3,202	3,218
Change	0.0	-19.9	-13.4	-16.3	-14.7	-15.1	-14.1	-14.1	-13.3	-13.2	-12.6
% chg	0.00%	-0.64%	-0.43%	-0.52%	-0.47%	-0.48%	-0.45%	-0.44%	-0.42%	-0.41%	-0.39%
Ending Stocks											
Baseline	7,787	7,831	7,830	7,855	7,880	7,954	8,026	8,080	8,143	8,194	8,238
Scenario	7,787	7,756	7,762	7,779	7,808	7,883	7,959	8,016	8,082	8,135	8,182
Change	0.0	-75.1	-67.8	-75.8	-71.6	-70.5	-66.9	-64.5	-61.1	-58.7	-56.0
% chg	0.00%	-0.96%	-0.87%	-0.96%	-0.91%	-0.89%	-0.83%	-0.80%	-0.75%	-0.72%	-0.68%
Consumption											
Baseline	6,600	6,140	6,094	6,150	6,237	6,316	6,404	6,470	6,549	6,633	6,702
Scenario	6,600	6,095	6,062	6,111	6,201	6,279	6,369	6,435	6,515	6,600	6,670
Change	0.0	-44.4	-32.4	-38.8	-36.0	-37.0	-35.4	-35.4	-33.8	-33.6	-32.2
% chg	0.00%	-0.72%	-0.53%	-0.63%	-0.58%	-0.59%	-0.55%	-0.55%	-0.52%	-0.51%	-0.48%
Canada											
Production											
Baseline	24,200	25,056	25,409	25,511	25,697	26,015	26,207	26,189	26,330	26,541	26,689
Scenario	24,200	25,053	25,728	25,726	25,962	26,260	26,467	26,440	26,589	26,794	26,946
Change	0.0	-2.5	319.6	215.4	264.7	245.4	260.0	250.9	259.2	252.8	257.1
% chg	0.00%	-0.01%	1.26%	0.84%	1.03%	0.94%	0.99%	0.96%	0.98%	0.95%	0.96%
Feed Use											
Baseline	3,700	3,296	3,384	3,367	3,459	3,500	3,587	3,619	3,633	3,670	3,716
Scenario	3,700	3,309	3,394	3,376	3,467	3,507	3,595	3,625	3,640	3,675	3,722
Change	0.0	13.1	9.3	9.0	8.5	7.7	7.9	6.6	6.6	5.7	6.2
% chg	0.00%	0.40%	0.27%	0.27%	0.25%	0.22%	0.22%	0.18%	0.18%	0.16%	0.17%
Food and Other											
Baseline	5,100	5,331	5,422	5,469	5,533	5,608	5,708	5,773	5,834	5,917	5,976
Scenario	5,100	5,336	5,425	5,470	5,536	5,609	5,710	5,773	5,835	5,917	5,977
Change	0.0	5.6	2.7	1.1	2.7	0.7	2.2	0.5	1.5	0.2	1.1
% chg	0.00%	0.10%	0.05%	0.02%	0.05%	0.01%	0.04%	0.01%	0.03%	0.00%	0.02%
Ending Stocks											
Baseline	4,989	5,006	4,954	4,864	4,880	4,946	5,086	5,139	5,207	5,306	5,369
Scenario	4,989	5,006	4,954	4,864	4,880	4,946	5,086	5,139	5,207	5,306	5,369
Change	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
% chg	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Consumption											
Baseline	8,800	8,627	8,807	8,836	8,992	9,108	9,295	9,392	9,467	9,587	9,692
Scenario	8,800	8,645	8,819	8,847	9,003	9,116	9,305	9,399	9,475	9,593	9,700
Change	0.0	18.6	12.0	10.1	11.2	8.4	10.0	7.1	8.1	5.9	7.4
% chg	0.00%	0.22%	0.14%	0.11%	0.12%	0.09%	0.11%	0.08%	0.09%	0.06%	0.08%

China Scenario: Wheat Production and Consumption (continued)

	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22
China	(Thousand Metric Tons)										
Production											
Baseline	117,000	118,009	122,983	123,262	123,776	124,766	125,265	125,615	126,493	127,049	127,486
Scenario	117,000	114,967	116,990	117,604	117,853	118,680	119,271	119,550	120,359	120,941	121,359
Change	0.0	-3,041.9	-5,992.9	-5,658.1	-5,923.9	-6,085.9	-5,994.5	-6,064.5	-6,134.1	-6,107.5	-6,126.8
% chg	0.00%	-2.58%	-4.87%	-4.59%	-4.79%	-4.88%	-4.79%	-4.83%	-4.85%	-4.81%	-4.81%
Feed Use											
Baseline	17,000	17,802	18,301	18,672	19,228	19,741	20,273	20,761	21,255	21,743	22,256
Scenario	17,000	17,945	18,410	18,785	19,330	19,836	20,364	20,848	21,334	21,819	22,327
Change	0.0	143.1	109.1	112.9	102.3	95.2	91.6	86.7	79.8	75.5	70.5
% chg	0.00%	0.80%	0.60%	0.60%	0.53%	0.48%	0.45%	0.42%	0.38%	0.35%	0.32%
Food and Other											
Baseline	96,000	96,806	104,402	104,424	104,834	105,459	105,765	105,886	106,327	106,709	106,910
Scenario	96,000	100,767	107,421	107,416	107,530	107,872	108,055	107,992	108,226	108,459	108,498
Change	0.0	3,960.7	3,019.0	2,992.9	2,696.7	2,412.7	2,289.3	2,106.3	1,898.3	1,750.0	1,587.7
% chg	0.00%	4.09%	2.89%	2.87%	2.57%	2.29%	2.16%	1.99%	1.79%	1.64%	1.49%
Ending Stocks											
Baseline	64,591	68,674	69,749	70,841	71,611	72,371	72,932	73,375	73,917	74,297	74,553
Scenario	64,591	70,486	71,285	72,327	72,959	73,571	74,063	74,413	74,852	75,155	75,330
Change	0.0	1,811.5	1,536.2	1,485.9	1,348.4	1,199.9	1,130.7	1,038.5	935.4	858.6	777.3
% chg	0.00%	2.64%	2.20%	2.10%	1.88%	1.66%	1.55%	1.42%	1.27%	1.16%	1.04%
Consumption											
Baseline	113,000	114,608	122,703	123,096	124,061	125,200	126,038	126,647	127,582	128,453	129,166
Scenario	113,000	118,712	125,832	126,202	126,860	127,708	128,419	128,840	129,560	130,278	130,824
Change	0.0	4,103.8	3,128.1	3,105.8	2,799.0	2,507.9	2,380.9	2,193.0	1,978.1	1,825.5	1,658.3
% chg	0.00%	3.58%	2.55%	2.52%	2.26%	2.00%	1.89%	1.73%	1.55%	1.42%	1.28%
European Union											
Production											
Baseline	137,486	143,085	138,729	142,630	144,971	147,639	149,935	152,132	154,547	156,530	158,522
Scenario	137,486	143,131	138,875	142,708	145,059	147,719	150,013	152,212	154,623	156,605	158,595
Change	0.0	46.4	146.0	77.5	88.4	80.0	78.4	79.8	76.2	74.9	72.9
% chg	0.00%	0.03%	0.11%	0.05%	0.06%	0.05%	0.05%	0.05%	0.05%	0.05%	0.05%
Feed Use											
Baseline	56,500	56,935	55,031	55,880	56,708	57,746	58,653	59,512	60,485	61,354	62,232
Scenario	56,500	56,776	54,980	55,793	56,645	57,681	58,593	59,453	60,430	61,300	62,181
Change	0.0	-158.4	-50.5	-86.9	-62.7	-65.1	-60.2	-58.4	-55.0	-53.7	-50.4
% chg	0.00%	-0.28%	-0.09%	-0.16%	-0.11%	-0.11%	-0.10%	-0.10%	-0.09%	-0.09%	-0.08%
Food and Other											
Baseline	70,500	72,375	70,599	72,881	74,456	76,217	77,706	79,083	80,578	81,769	82,916
Scenario	70,500	72,184	70,553	72,785	74,391	76,147	77,640	79,020	80,518	81,711	82,860
Change	0.0	-191.4	-46.0	-95.6	-65.9	-70.6	-66.5	-63.5	-60.5	-58.2	-56.3
% chg	0.00%	-0.26%	-0.07%	-0.13%	-0.09%	-0.09%	-0.09%	-0.08%	-0.08%	-0.07%	-0.07%
Ending Stocks											
Baseline	12,679	12,317	11,882	12,059	12,196	12,358	12,483	12,589	12,718	12,820	12,919
Scenario	12,679	12,291	11,873	12,045	12,185	12,347	12,472	12,580	12,709	12,811	12,911
Change	0.0	-26.7	-9.4	-14.4	-10.8	-10.9	-10.4	-9.8	-9.3	-8.9	-8.4
% chg	0.00%	-0.22%	-0.08%	-0.12%	-0.09%	-0.09%	-0.08%	-0.08%	-0.07%	-0.07%	-0.07%
Consumption											
Baseline	127,000	129,310	125,630	128,761	131,164	133,963	136,360	138,595	141,063	143,123	145,147
Scenario	127,000	128,960	125,533	128,578	131,036	133,828	136,233	138,473	140,947	143,011	145,041
Change	0.0	-349.9	-96.5	-182.6	-128.6	-135.7	-126.7	-121.9	-115.5	-111.9	-106.7
% chg	0.00%	-0.27%	-0.08%	-0.14%	-0.10%	-0.10%	-0.09%	-0.09%	-0.08%	-0.08%	-0.07%